BREAST CANCER BEFORE AND DURING THE AIDS EPIDEMIC IN WOMEN AND MEN: A STUDY OF TANZANIAN CANCER REGISTRY DATA 1968 TO 1996

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Kaposi's sarcoma and malignant lymphoma are two cancers that are most often associated with human immunodeficiency virus (HIV) infection. Recently, other cancers, including cervical cancer, have been associated with AIDS. The role of HIV in the pathogenesis of these malignancies is not well understood, and few studies have been done to determine any general increase in cancers after the onset of the HIV epidemic. This study compared breast cancer before and during the AIDS period by studying the total Tanzanian Cancer Registry data (1968 to 1996). The mean age among males increased from 50.88 to 52.63 years ($p = 0.45$) and among females decreased from 44.79 to 43.23 years ($p = 0.005$) before and during the AIDS epidemic, respectively. A statistically significant decrease in the incidence of breast cancer was observed during the AIDS epidemic period in both males ($p = 0.001$) and females ($p = 0.021$). The male-to-female ratio widened significantly from 0.09:1 to 0.03:1 ($p = 0.0001$). Further studies are needed to determine the incidence and observed changes of different cancers, including breast among patients with HIV/AIDS. (*J Natl Med Assoc.* 2000;92:301–305.)

Key words: breast cancer ♦ AIDS ♦ ♦ Tanzania Cancer Registry ♦ HIV

Breast cancer is second to cervical cancer as the most common malignancy among females in sub-Sahara African countries.[1] This cancer affects both sexes but with dissimilar male-to-female ratios in different geographical regions. However, the prevalence of breast cancer among men in Western countries is less frequent than that found in sub-Sahara Africa.[2]

The prevalence of human immunodeficiency syndrome (HIV) infection in the different countries of East Africa ranges between 10% and 30% in the sexually active adults and is still rising.[3] In this region, with a population of about 135 million,[3] the full impact of HIV infection has yet to be determined, particularly its relationship to different cancers.

In the 1980s, when HIV infection was first recognized, it was also observed that some cancers occurred more often in patients infected with HIV. Since then, several studies have reported that Kaposi's sarcoma was the most common AIDS-associated malignancy but with different presentation in com-

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Table 1. Sex-specific Proportionate Morbidity of Breast Cancer in Tanzania, 1968 to 1996

	Overall cancer		Males cancer*		Females cancer†	
Period (years)	Total (*N*)	Breast (%)	Total (*N*)	Breast (%)	Total (*N*)	Breast (%)
Pre-AIDS						
1968–70	2929	4.19	1310	0.46	1619	7.23
1971–73	4427	4.79	1978	1.01	2449	7.84
1974–76	4604	4.41	2157	0.65	2447	7.72
1977–79	5188	4.07	2403	0.71	2785	6.96
1980–82	5759	4.67	2591	0.93	3168	7.73
AIDS period						
1983–85	4212	6.08	1672	0.66	2540	9.64
1986–88	3244	7.27	1231	0.96	2013	11.13
1989–91	4125	5.31	1316	0.68	2809	7.47
1992–94	3918	8.19	1181	0.09	2737	11.69
1995–96	2765	6.29	908	0.33	1857	9.21

*$\chi^2 = 3.76$, $p = 0.05$.
†$\chi^2 = 29.44$, $p = 0.001$ for linear trend.

parison to the endemic type.[4–6] Other reports have suggested that conjunctival cancer, anorectal cancer, and non-Hodgkin's lymphoma were also frequently associated with HIV infection.[4,7] Interestingly, only a few cases of breast cancer have been reported in both sexes in patients with HIV infection,[8–12] and an association between these two conditions has yet to be determined. However, HIV infection is hyperendemic in the sub-Sahara African population and malignancies may also coexist.

It was therefore important to study the total breast cancer data recorded in the Tanzania Cancer Registry (1968 to 1996) for any changes in its demographics before and during the AIDS epidemic in both sexes.

MATERIAL AND METHODS

The Tanzania Cancer Registry is situated in the Department of Pathology of the Muhimbili University College of Health Sciences, University of Dar es Salaam, which is the National Cancer Registry. Since its establishment, it has registered 2228 patients with breast cancer from October 1968 to December 1996. Histological confirmation was available for all cases.

Data for these cases were entered on a computer and analyzed using the programs Statistix 4.1 (Sigma Research Associates, La Jolla, CA) and Epi Info 6 (Centers for Disease Control and Prevention, Atlanta, GA). The study comprises nine periods: 1968–70, 1971–73, 1974–76, 1977–79, 1980–82, 1983–85, 1986–88, 1989–91, 1992–94, and 1995–96. The initial five periods, 1968–82, were labeled as "pre-AIDS, whereas the four subsequent periods were named as "AIDS epidemic." The year 1983 was the year the first case of AIDS was reported from Tanzania. Differences between mean age within groups were assessed using one-way analysis of variance. Trends in breast cancer proportional morbidity were tested by the chi-squared test for linear trend. The incidence rate was estimated using the Tanzania census population[13] as the denominator. For the years where no such data were available, population projections were determined using the exponential formula.[14]

RESULTS

A total of 41,171 cases were recorded in the Tanzanian Cancer Registry from 1968 to 1996 (28 years), of which 16,747 (40.68%) were males and 24,424 (59.32%) were females. Of these, 2228 (5.41%) were patients with breast cancer, with 117 (5.25%) being male and 2111 (94.75%) female.

Table 1 shows the proportional morbidity pattern of breast cancer in both sexes. There was a decreasing trend in the percentage of breast cancer among the males after the year 1982 ($\chi^2 = 3.76$, $p = 0.05$). Conversely, there was an increasing trend in the percentage of breast cancer among the females during the same period ($\chi^2 = 29.44$, $p = 0.001$).

When the mean age of breast cancer in the pre-

Table 2. Sex-specific Mean Age and Gender Ratios before and during the AIDS Epidemic Period for Breast Cancer Cases (1968 to 1996)

	Pre-AIDS period (1968–1982)				AIDS epidemic period (1983–1996)				
Sex	N	Mean age (years)	SD	Gender ratio	N	Mean age (years)	SD	Gender ratio	p value
M	81	50.88	11.62		36	52.63	11.69		0.45
F	937	44.79	12.54		1174	43.23	12.81		0.005
M	81			0.09:1	36			0.03:1	0.001
F	937				1174				

AIDS period was compared with the mean age of the AIDS epidemic period among females, a decrease in the mean age from 44.8 to 43.2 years, respectively, was observed ($p = 0.005$). However, this change was not observed among the males ($p = 0.45$). The male-to-female ratio widened significantly from 0.09:1 to 0.03:1 ($p = 0.001$) (Table 2).

Figure 1 shows the incidence rates of breast cancer among both sexes before and during the AIDS epidemic period. A statistically significant decrease in the incidence rate of breast cancer in both males ($p = 0.001$) and females ($p = 0.021$) was observed after 1982. However, there was an isolated peak after this year in females.

DISCUSSION

Carcinoma of the breast is a public health problem in females throughout the world. In males breast cancer among whites is 100-fold less than in women, the ratio ranging from 0.5:100 to 1:100,[15,16] whereas this ratio varies from 1:7 to 1:64 in the African population.[1,17] This ratio has been observed to decrease only in those populations with a greater number of cervical cancer, suggesting an association between these two cancers.[17]

In the period studied it was observed that the percentage of breast cancer among males decreased but the opposite was true among females. These changes are particularly seen after 1983, the year the first case of HIV infection was reported in Tanzania.[18] However, an interest in studying breast carcinoma in the African population has been documented recently,[2,16,19,20] and this may have contributed to an increase in the screening activity. This increase in numbers may also suggest an increased awareness of the disease among females.

A steady decrease in the breast cancer incidence rate in both sexes after 1982 during the AIDS epidemic has been observed in both males and females in the present study, with an isolated peak at the end of this study period. In general the observed rates are lower than those from western countries. There is underreporting of cancer cases from sub-Saharan African countries due to several reasons such as use of alternative remedies, failure of the referral system, and economic difficulty.[21] However, such a situation would be represented by a fluctuating incidence rate rather then a steep decline as observed in the present study. Because the decline of breast cancer cases in Tanzania coincided with the emergence of the AIDS epidemic, the two may have a relationship.[18,22]

When the mean age of breast cancer in the pre-AIDS period was compared with the mean age of the AIDS epidemic period, it was observed that the females were younger than expected ($p = 0.005$), but such a change was not observed among the males ($p = 0.45$). However, the male-to-female ratio widened significantly from 0.09:1 to 0.03:1, indicating a bigger decrease in males with breast cancer during the AIDS epidemic ($p = 0.001$).

HIV infection in Africa is commonly seen in the 20- to 29-year and 25- to 34-year age groups among females and males, respectively. A large percentage of these patients will die owing to opportunistic infections.[4,23–26] Among these patients, Kaposi's sarcoma, malignant lymphoma, and cervical cancer are markedly increased[4,27–28] but not breast cancer. This suggests that HIV may not be a cofactor in the pathogenesis of breast cancer.

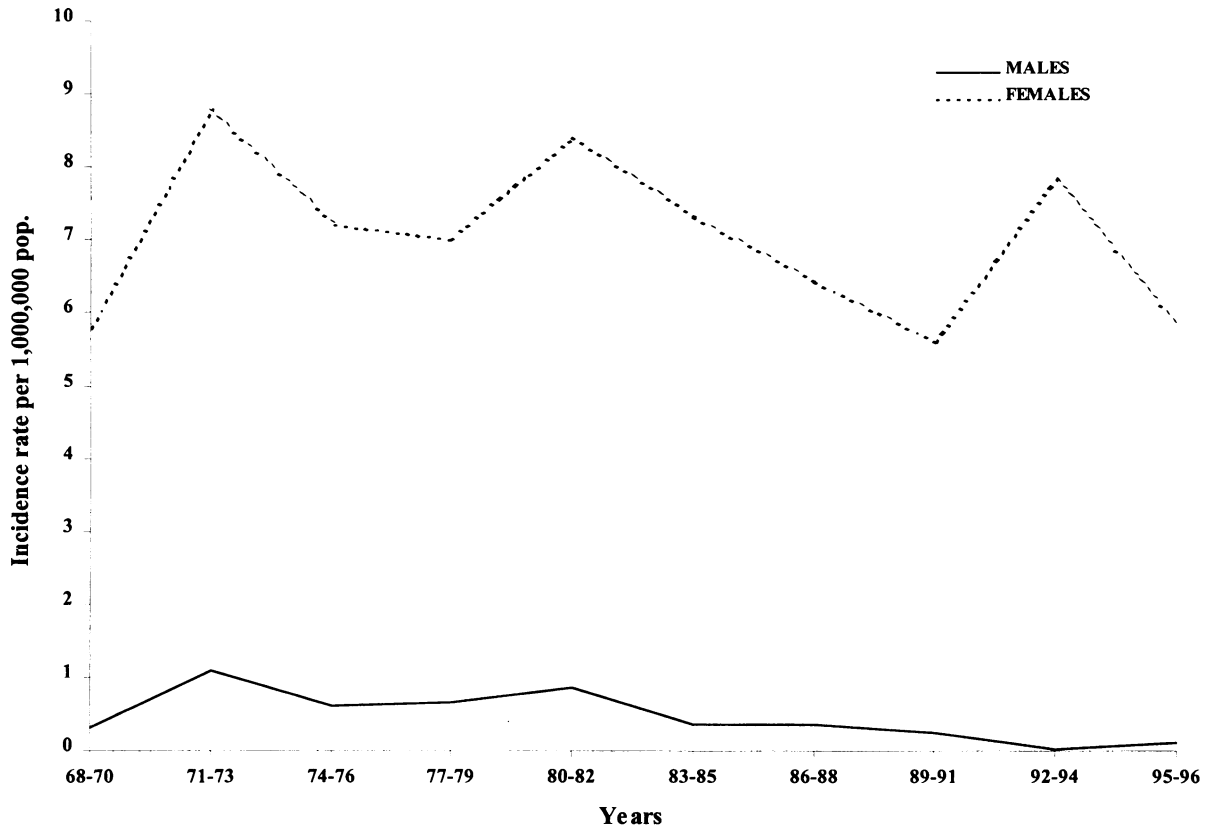

Figure 1. Incidence rates of breast cancer among women and men before and during the AIDS epidemic period.

In western countries a rapid increase in AIDS cases in women as compared to men has been observed recently, with the majority of these HIV-infected individuals coming from low socioeconomic groups where coexisting infections and AIDS-associated mortality are common.[29] The impact of AIDS on mortality is increasing, particularly in sub-Saharan Africa. By the year 2005 the population of the most severely affected countries, including Tanzania, will be 13 to 59 million less than it would have been without AIDS.[30]

In conclusion, the incidence of breast cancer was found to be declined in both sexes and to be more pronounced in males in this study. A decrease in the mean age was also observed in females with breast cancer. Further studies are needed to investigate the incidence and observed changes in different cancers, including breast cancer among HIV/AIDS patients in different geographical regions. This information could be invaluable to cancer control strategists, health care providers, and researchers in cancer.

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